CHAPTER 4. IDENTIFYING AND EVALUATING TRADING OPPORTUNITIES

*A **screening approach** helps water quality managers, dischargers, and other stakeholders apply Clean Water Act and economic principles in a systematic way to take advantage of options, such as trading, that meet water quality objectives and improve cost-effectiveness.*

Where to Begin?

Chapters 2 and 3 introduced a series of CWA principles and economic concepts that lay the foundation for successful trading— from a single trade to a watershed-wide trading program. The question remains: How can someone apply those principles to real-world situations and identify places where trading could be a viable option? And once such candidates are identified, how should someone go about evaluating how well site-specific conditions and program choices meet those principles?

A screening process helps stakeholders focus on make-or-break issues first—those conditions which are difficult to change or accommodate—before moving on to other issues. For example, if no potential trades can meet CWA principles, economic and administrative issues are moot.   A screening process also groups related issues together to streamline consideration of many issues.

The exact order in which someone addresses relevant issues in a screening process beyond starting with a water quality standard depends on who potential traders are and what their interests and priorities are. For example, dischargers might start with a given water quality objective first, examine preliminary economic questions second, revisit water quality issues, and then conduct more detailed economic analysis, and so forth.

A screening process can be conducted in iterations to provide the level of analysis necessary for evaluative and decision-making purposes.

A Screening Process for Trading

Determining the potential for trading hinges on three major questions:

1. Are trades consistent with water quality and other environmental objectives?

2. Will any potential trading partners benefit from trading?

3. Are administrative arrangements available to support trading?

Together, these questions form the basis of a screening process that can help identify and evaluate potential trading opportunities. Each of the CWA principles and economic concepts presented in Chapters 2 and 3 is represented in at least one of these questions.

Stakeholders first begin with a given water quality objective and then ask whether it is possible to reach that objective more cost-effectively. This approach represents a bottom-up development process that many existing trading programs and programs currently under consideration have followed.

In practice, the questions above can be conceptualized as points of a triangle:

Water Quality

●

Economics   *Administration*

After starting with water quality, the direction taken depends on who you are. Further, it might be necessary to go around the triangle (through the screening process) more than once to arrive at a final go/no go decision. The three issue sets described here are interrelated: how stakeholders answer and resolve any one set of questions affects, constrains, and creates opportunities for other issues.

This chapter provides two screening processes that help identify and evaluate trading opportunities. The first process is somewhat broad and can be used to streamline identification of viable trading opportunities. As described above, three broad levels of screening criteria can be used to identify and evaluate potential trading programs. Level 1 examines how trading will support water quality standards; Level 2 determines availability of economic benefits to trading partners; and Level 3 examines accessibility to administrative and institutional support.

The second process is essentially a checklist of threshold conditions that should be met for a trading program to succeed. Together, these screening processes also can be used to guide design of a trading program and to measure the probability of success.

Screening Level 1: Consistency With Water Quality and Environmental Objectives

The initial step is to determine whether a trade will support water quality objectives.

Trading will be most attractive if (1) sources that already meet technology-based requirements are looking for an alternative way to meet more stringent water quality-based limits or (2) a number of sources are faced with further pollutant reductions to meet an in-stream water quality standard.

Clean Water Act provisions establish guideposts for trading that can be used to assess a proposed trading program*s consistency with the statute and regulations. Trading that is consistent with water quality standards generally meets the principles outlined in Chapter 2. The purpose of Screening Level 1 is to determine if and how these principles can be met.

Screening for consistency with water quality and environmental objectives can be accomplished in several ways, depending on available information. Three related screening tools are discussed below: (1) use of existing regulatory information (2) water quality monitoring data and simple analysis, and (3) more complex analysis and the use of computer simulation models.

After determining that a candidate for trading can satisfy CWA provisions, it is essential to note any adjustments in trading proposals that might be necessary to ensure compliance with the CWA. These adjustments should then be reviewed to ensure that economic benefits identified under Screening Level 2 are preserved.

Regulatory Information. A review of regulatory documents, such as NPDES permits, local ordinances, and compliance reports, helps determine whether technology-based requirements are in place where appropriate. The effective dates of

enforceable requirements provide a context for evaluating where a potential trader stands with respect to applicable technology-based requirements. Permits and management plans usually indicate how long such enforcement mechanisms have been in place and when they are scheduled for review, renewal, or revision.

Reviewing the language and structure of such tools can help determine whether trading arrangements can be incorporated into existing enforcement mechanisms. This review also provides assurances that trades would be consistent with the anti-backsliding requirement. When regulatory documents and proposed trades are complex, discussions with appropriate permit writers and managers can clarify expected trading effects.

Data and Simple Analysis. Ambient and effluent water quality monitoring data and analysis can help determine if potential trades meet the principles outlined in Chapter 2. Where data and analytical tools are available, analysts can estimate impacts of reallocations of pollutant loading reductions or other water quality improvements in a manner that might occur under trading.

Various analyses can indicate what trades are likely to support water quality and enhance compliance with the anti-degradation policy. Analysis also can identify what types of trades might create localized effects and threaten ambient or local standards. Additionally, when assessing potential trades, dischargers* geographic locations should be identified, noting any special considerations, such as shallow streams, dissolved oxygen sags, or poorly mixed areas (e.g., embayments, lagoons).

Where ambient data are unavailable, or of suspect quality, it might be possible to identify and evaluate potential trading candidates using relatively simple calculations (e.g., mass balance). However, for trades involving nonpoint sources, it might be necessary to gather additional ambient data.

Complex Analysis and Models. While simple calculations using available data might be adequate, a variety of computer models are available to help understand the potential effects of trading on water quality (although some computer models might be too complex for screening purposes). Models are used to understand how pollutant loads and waterbody responses change with trades, considering spatial, temporal, and chemical parameters. In many cases, these models can provide the information needed to evaluate the compliance of trading actions with CWA provisions. More sophisticated analysis may be necessary where trading is considered for complex waterbodies, numerous potential traders, or pollutants for which precise safeguards are required. EPA*s *Compendium of Watershed-Scale Models for TMDL Development* (EPA 841-R-92-002, June 1992) provides detailed information on available models.

Screening Level 2: Economic Benefits to Trading Partners

As described in Chapter 3, cost savings are a primary attraction to trading among sources of pollution. Dischargers will be interested in buying or selling water quality improvements when such transactions reduce their costs to meet environmental objectives. They also will be interested if trading allows expansion of an existing facility or location of a new source that would not have been possible without

trades. Where economic benefits are unavailable, interest in trading by pollution sources is likely to be weak.

To determine if dischargers might be interested in trading, stakeholders might want to estimate a unit load reduction cost for each potential trader. A list of these costs can provide a range of cost reductions. The size of unit cost differences among potential traders is a good indicator of the strength and stability of economic benefits from trading. Another useful indicator is the magnitude of cost savings that dischargers can realize. Therefore, stakeholders in trading should estimate the total amount of pollution reduction that can be traded among dischargers. This estimate, along with information on unit costs, can be used to compute the total cost savings available from trading.

If it is not possible to obtain preliminary estimates of incremental unit load reduction costs, stakeholders may examine many other characteristics of potential traders that indicate differences in unit costs. Several such characteristics are listed below.

- *Potential traders are numerous*—The probability of finding dischargers with different unit load reduction costs increases as the number of dischargers increases.

- *Potential traders treat varying amounts of effluent*—As discussed in Chapter 3, dischargers that treat larger amounts of effluent tend to have lower unit costs. Thus, if some dischargers treat different amounts of effluent than others, there are likely to be differences in unit costs.

- *Potential traders use different technologies to treat effluent (including older treatment equipment)*—Unit load reduction costs are dependent on the equipment and technology used to treat effluent. Usually, newer technology is more efficient and can achieve lower unit costs over the long term. Older treatment technologies, on the other hand, might be less efficient, resulting in relatively higher unit costs. Therefore, dischargers with different technology levels are likely to have different unit costs.

- *Potential traders treat effluent to different degrees*—As a discharger gets closer to removing 100 percent of a pollutant from its effluent, it is more likely to incur higher pollution control costs. In fact, the cost of pollution control tends to increase at an increasing rate the closer a discharger gets to full removal of a pollutant. Therefore, potential traders treating varying percentages of their pollutant loads are likely to have different unit load reduction costs (although similar facilities generally use similar technologies and treat to similar performance levels).

Screening Level 3: Coordination and Administrative Support

Where water quality objectives and economic benefits appear achievable, the last level of the screening process addresses the administrative feasibility of trading. Screening Level 3 asks the question: Do potential traders—public and/or private—have sufficient resources and a cooperative setting in which to administer a trading program? Important issues to examine are identified below.

■ *Matching administrative capabilities to the scope of trading activities*—Careful attention should be given to matching the level of administration to the scope of trading. Overly complex or centralized administration establishes unnecessary technical and budgetary requirements that raise costs associated with participation. Alternatively, inappropriately weak or decentralized structures fail to provide necessary support and place a greater burden on participants to identify each other and establish trades. As the number of participants increases, trading might benefit from more formalized administration (which again, can be publicly and/or privately provided) that can provide clearinghouse and facilitation functions.

■ *Information needs of participants*—When participants have adequate access to information about trading options and potential trading partners, cost savings can be maximized. Useful information relates to who is trading what, where and when, and at what price. Trade administrators should be able to facilitate information flow.

■ *Institutional responsibilities*—Many organizations play a role in trading, necessitating clearly defined responsibilities. Assigning responsibilities requires creative use of existing institutional structures to maximize effectiveness and minimize the need for additional resources. Local institutions (public and/or private) are likely to be more effective than state or federal agencies alone for site-specific trading programs.

■ *Consensus on the role of trading*—Achieving consensus is an important

precursor to developing and implementing a trading program. Trade administrators should receive watershed-wide support for trading programs before development and implementation.

■ *Tracking and documenting trades*—Trade administrators need to have the capability to track and document trades. Such capability is essential to ensuring compliance with traded responsibilities. Tracking also provides a storehouse of information that is important to potential traders. A number of options are available to conduct any necessary tracking. For example, trading parties and/or a regulatory agency could assume responsibility.

■ *Ongoing monitoring*—In addition to tracking trades, administrators need to be able to track the impacts of trades on water quality. As discussed in Chapter 2, once trades are initiated, ongoing ambient and effluent monitoring data are needed to determine whether trades are meeting water quality standards and traders are meeting applicable limits.

■ *Accountability and enforcement*—Organizations responsible for trading programs need to have access to enforcement mechanisms that allow them to uphold all provisions of the trading program and meet requirements of the CWA.

Template of Favorable Conditions

The three-level screening process described above can assist in determining whether a particular trading opportunity satisfies broad criteria for success. Moving from Level 1 to Level 3 sequentially

provides an efficient way to screen out weak candidates and focuses attention on stronger ones.

Each broadly drawn criterion comprises several narrow, specific criteria. Many of these specific criteria represent CWA principles for trading identified in Chapter 2 and economic conditions described in Chapter 3. Others are separate conditions or situations that are important for successful trading. Together, these principles form a set of favorable conditions for trading. As more of these conditions can be met, a more solid opportunity exists to use trading as a cost-effective and ecologically sound water quality management tool.

These conditions can be incorporated into a screening process that may be applied to a potential trading program subsequent to the broad three-level process. The conditions might also serve as a valuable design checklist when preparing a trading program for implementation.

The conditions listed in the checklist below apply to all types of trading discussed in this framework. These general conditions provide a template that is the basis for the type-specific checklists provided in Chapters 5 through 8.

Legal and Regulatory Conditions	
General:	
• Is trading implemented within the context of Clean Water Act statutory and regulatory requirements ?	yes no
Specific:	
• Is trading consistent with applicable technology-based requirements?	yes no
• Are resultant conditions from trading expected to achieve water quality standards?	yes no
• Is trading consistent with the anti-degradation policy?	yes no
• Is trading consistent with anti-backsliding requirements?	yes no
Economic Conditions	
General:	
C Can dischargers save or make money by trading (i.e., are there economic incentives to trade)?	yes no
Specific:	
• Are total incremental costs for pollution reduction, which include direct incremental costs and transaction costs, different among dischargers?	yes no
• Do cost differentials among dischargers allow one discharger to reduce pollution more cheaply than another?	yes no
• Are transaction costs less than cost savings from the trade?	yes no
• Do cost savings from trading outweigh the uncertainty that dischargers face under trading schemes?	yes no
• Is there a sufficient supply of pollution reduction for sale, and a reasonable demand to buy reduction credits?	yes no
• Are potential aggregate savings to a trading candidate large enough to attract serious interest?	yes no
Data Availability Conditions	
General:	
• Are the data necessary to implement a trading program available or estimable?	yes no
Specific:	
• Are there are enough data to understand pollution quantities and flows within the watershed (e.g., have water quality authorities conducted a TMDL)?	yes no
• Can regulatory authorities monitor water quality across the trading area and points of discharge under trading?	yes no
• Can dischargers estimate their direct costs of reducing a specified unit(s) of pollution?	yes no
• Can dischargers estimate transaction costs that they would have to pay to conduct trades?	yes no

Administrative and Institutional Conditions	
General:	
• Are governmental authorities and potential trading participants capable of administering a trading program?	yes no
Specific:	
• Do governmental authorities have enforcement mechanisms to ensure trades are being implemented correctly and applicable limits are being met?	yes no
• Is information about trading partners readily available so that buyers and sellers can coordinate?	yes no
• Are responsibilities clearly defined for institutions and dischargers taking part in trading?	yes no
• Is the scope of administrative infrastructure compatible with the amount and complexity of the trading that is expected?	yes no
• Has the administering agency established who is accountable for implementing measures to reduce pollutant loading?	yes no
• Has the administering agency established who is accountable for water quality improvements?	yes no
• Is the agency that enforces trading provisions able to give necessary feedback to parties responsible for water quality?	yes no